

**WHAT IS CLAIMED IS:**

1. An etching method of etching a fragile layer of a member having the fragile layer, comprising:
  - vaporizing a liquid etchant to etch the fragile
- 5 layer of the member with the vaporized etchant.
2. The method according to claim 1, wherein the fragile layer includes a porous layer or an ion-implanted layer.
3. The method according to claim 1, wherein
  - 10 the fragile layer includes silicon having a fragile structure, and
  - the etchant contains hydrogen fluoride and hydrogen peroxide.
4. The method according to claim 1, wherein the
  - 15 liquid etchant is vaporized by heating.
5. The method according to claim 4, wherein the liquid etchant is vaporized by heating the liquid etchant to a temperature within a range of 40 to 50° C.
6. An etching apparatus for etching a member,
  - 20 comprising:
    - a reaction vessel which stores the member; and
    - a vaporization unit which vaporizes a liquid etchant by heating.
7. The apparatus according to claim 6, wherein the
  - 25 member stored in the reaction vessel is etched with the vaporized etchant.
8. The apparatus according to claim 6, wherein the

vaporization unit is so configured as to vaporize the liquid etchant inside the reaction vessel.

9. The apparatus according to claim 6, wherein  
the vaporization unit is so configured as to  
5 vaporize the liquid etchant outside the reaction  
vessel, and

the etching apparatus further comprises a supply portion which supplies the etchant vaporized by the vaporization unit into the reaction vessel.

10 10. The apparatus according to claim 9, wherein  
the supply portion includes  
an etchant vessel which stores the liquid  
etchant,

a first supply path which supplies a  
15 predetermined gas to the etchant vessel, and  
a second supply path which communicates the  
etchant vessel with the reaction vessel, and  
the supply portion is so configured as to supply  
the predetermined gas into the etchant vessel via the  
20 first supply path and supply the etchant vaporized in  
the etchant vessel into the reaction vessel via the  
second supply path.

11. The apparatus according to claim 6, wherein the  
vaporization unit is so configured as to be able to  
25 heat the liquid etchant to a temperature within a range  
of 40 to 50°C.

12. An etching apparatus for etching a member,

comprising:

a reaction vessel which stores the member; and  
a vaporization unit which vaporizes a liquid  
etchant inside the reaction vessel,

5 wherein the member stored in the reaction vessel  
is etched with the vaporized etchant.

13. The apparatus according to claim 12, wherein the  
vaporization unit is so configured as to vaporize the  
liquid etchant by heating.

10 14. An etching apparatus for etching a member,  
comprising:

a reaction vessel which stores the member;  
an etchant vessel which is arranged outside the  
reaction vessel and stores a liquid etchant;

15 a vaporization unit which vaporizes the etchant  
in the etchant vessel;

a first supply path which supplies a  
predetermined gas into the etchant vessel; and  
a second supply path which communicates the  
20 etchant vessel with the reaction vessel,

wherein the etchant vaporized in the etchant  
vessel is supplied into the reaction vessel via the  
second supply path by supplying the predetermined gas  
into the etchant vessel via the first supply path.

25 15. The apparatus according to claim 14, wherein the  
vaporization unit is so configured as to vaporize the  
liquid etchant by heating.

16. A substrate manufacturing method comprising steps of:

preparing a first substrate having a fragile layer and a transfer layer formed on the fragile layer;

5 bonding a surface of the transfer layer of the first substrate to a second substrate to fabricate a bonded substrate stack;

dividing the bonded substrate stack at a portion of the fragile layer; and

10 etching the fragile layer remaining on the transfer layer transferred to the second substrate,

wherein the etching step includes a step of vaporizing a liquid etchant and etching the remaining fragile layer with the vaporized etchant.

15 17. The method according to claim 16, wherein the fragile layer includes a porous layer or an ion-implanted layer.